

## CLAIMS

We claim:

1. A hand-held computer device for interactive data acquisition, comprising:

- a display screen;
- a central processing unit;
- memory for dynamic storage of programs and data: .memory for static storage of programs and data;
- means for connecting said hand-held computer device to an external computer;
- an operating system for said hand-held computer device;
- a set of controls for user interaction with said hand-held computer device;
- means for interactive data acquisition, further comprising;
- application software means for configuring said controls for user interaction; and,
- application software means governing said interactive data acquisition; and,
- a attachable module for configurable data acquisition, wherein said attachable module further comprises;
- means for communication with said hand-held computer device;
- means for connection to an external sensor; and,
- an analog-to-digital converter to translate analog data readings from said external sensor to digital signals for transmission to said hand-held computer device.

2. A hand-held computer device for interactive data acquisition as set forth in claim 1, wherein said application software means for configuring said controls for user interaction further comprises:

- software to configure said set of controls to the allowable operations to be performed by said user during the data acquisition process.

3. A hand-held computer device for interactive data acquisition as set forth in claim 1, wherein said application software means governing said interactive data acquisition further comprises:

- software to govern the initiation, ending, and collection of data by the use of said set of controls by the user of said hand-held computer device, wherein said software includes means for using said controls as configured to selectively: accept said digital signals from said attachable module;
- display said digital signals from the attachable module for configurable data acquisition on said display screen;
- record said digital signals from the attachable module for configurable data acquisition into said dynamic memory;
- record said digital signals from the attachable module for configurable data acquisition into said static memory for long-term, unpowered storage; and
- perform all other allowable operations to be performed by said user during the data acquisition process.

4. A hand-held computer device for interactive data acquisition as set forth in claim 2 or 3, wherein said means for interactive data acquisition can be configured to meet requirements of a particular external sensor attached to said attachable module.

5. A hand-held computer device for interactive data acquisition as set forth in claim 1 or 3, wherein said software to govern the initiation, ending, and collection of data further comprises

software to configure the analog-to-digital conversion translation of said analog data readings from said external sensor to digital signals for transmission to said hand-held computer device.

6. A hand-held computer device for interactive data acquisition as set forth in claim 1, wherein said application software means governing said interactive data acquisition includes software for communicating said digital signals from said external sensor to means for connecting said hand-held computer device to an external computer.

7. A hand-held computer device for interactive data acquisition as set forth in claim 3, wherein said application software means governing said interactive data acquisition further includes

- software for communicating from said external computer specific software instructions to govern the initiation, ending, and collection of data;
- software for displaying on said display screen the specific software instructions communicated from said external computer; and,
- software for displaying on said display screen said digital signals from the attachable module acquired as a result of the specific software instructions communicated from said external computer to said hand-held computer device.

8. A hand-held computer device for interactive data acquisition as set forth in claims 3 or 7, wherein said application software means governing said interactive data acquisition further includes an expert system application appropriate to said attachable module, sensor, and user.

9. A hand-held computer device for interactive data acquisition as set forth in claims 1 or 3, wherein said hand-held device includes a connection through which electrical power may be provided between it and said attachable module, and said attachable module for configurable data

acquisition further includes a connection through which electrical power may be provided between it and said external sensor.

10. A hand-held computer device for interactive data acquisition as set forth in claims 1 or 3, wherein said application software means governing said interactive data acquisition further includes software for error testing the analog-to-digital translation.

11. A hand-held computer device for interactive data acquisition, comprising:

- a display screen;
- a central processing unit;
- memory for dynamic storage of programs and data: .memory for static storage of programs and data;
- means for connecting said hand-held computer device to an external computer;
- an operating system for said hand-held computer device;
- a set of controls for user interaction with said hand-held computer device;
- means for interactive data acquisition, further comprising:
- application software means for configuring said controls for user interaction to the allowable operations to be performed by said user during the data acquisition process;
- and,
- application software means governing said interactive data acquisition, further comprising software to govern the initiation, ending, and collection of data by the use of said set of controls by the user of said hand-held computer device, wherein said software includes means for using said controls as configured to selectively:
- accept said digital signals from said attachable module;

- display said digital signals from the attachable module for configurable data acquisition on said display screen;
- record said digital signals from the attachable module for configurable data acquisition into said dynamic memory;
- record said digital signals from the attachable module for configurable data acquisition into said static memory for long-term, unpowered storage; and,
- perform all other allowable operations to be performed by said user during the data acquisition process and,
- a attachable module for configurable data acquisition, wherein said attachable module further comprises;
- means for communication with said hand-held computer device;
- means for connection to an external sensor; and,
- an analog-to-digital converter to translate analog data readings from said external sensor to digital signals for transmission to said hand-held computer device.

12. A hand-held computer device for interactive data acquisition as set forth in claim 11, wherein said application software means governing interactive data acquisition further includes software to display a preview of acquired data on said display screen.

13. A hand-held computer device for interactive data acquisition as set forth in claim 11, wherein said application software means governing interactive data acquisition further includes software to automatically record data.

14. A hand-held computer device for interactive data acquisition as set forth in claim 11 or 13, wherein said application software means governing interactive data acquisition further includes software to record data at said user's direct control.

15. A hand-held computer device for interactive data acquisition as set forth in claim 11, wherein said application software means governing interactive data acquisition further includes software for said user to manually direct data acquisition entries.

16. A hand-held computer device for interactive data acquisition as set forth in claim 11 or 15, wherein said application software means governing interactive data acquisition further includes software for said hand-held computer device to advise user as to when data acquisition should be done.

17. A hand-held computer device for interactive data acquisition and analysis, comprising:

- a display screen;
  - a central processing unit;
  - memory for dynamic storage of programs and data;
  - memory for static storage of programs and data;
  - means for connecting said hand-held computer device to an external computer;
  - an operating system for said hand-held computer device;
  - a set of controls for user interaction with said hand-held computer device;
  - means for interactive data acquisition, further comprising:
  - application software means for configuring said controls for user interaction to the allowable operations to be performed by said user during the data acquisition process;
- and,

- application software means governing said interactive data acquisition, further comprising software to govern the initiation, ending, and collection of data by the use of said set of controls by the user of said hand-held computer device, wherein said software includes means for using said controls as configured to selectively:
- accept said digital signals from said attachable module;
- display said digital signals from the attachable module for configurable data acquisition on said display screen;
- record said digital signals from the attachable module for configurable data acquisition into said dynamic memory;
- record said digital signals from the attachable module for configurable data acquisition into said static memory for long-term, unpowered storage; and,
- perform all other allowable operations to be performed by said user during the data acquisition process: .means for analyzing data; and,
- a attachable module for configurable data acquisition, wherein said attachable module further comprises:
  - means for communication with said hand-held computer device: .means for connection to an external sensor; and,
  - an analog-to-digital converter to translate analog data readings from said external sensor to digital signals for transmission to said hand-held computer device.

18. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data further comprise hardware that can compare one data record against a second.

19. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data further comprise software that can compare one data record against a second.

20. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data further enable analysis of multiple data records.

21. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data further enables display of a particular dynamic pattern resulting from said analysis a set of data records.

22. A hand-held computer device for interactive data acquisition and analysis a set forth in claim 17, wherein said means for analyzing data further enables display of a particular dynamic pattern resulting from said analysis a set of data records compared against a baseline data record.

23. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data further enables display of a particular dynamic pattern resulting from said analysis of a set of data records compared against at least one known limit.

24. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data further comprise means for;

- altering the process of data acquisition by changing the sampling method; and,
- comparing the data acquired before and after the sampling method has been

changed.



25. A hand-held computer device for interactive data acquisition and analysis as set forth in claims 17 or 24, wherein said alteration of the process of data acquisition comprises changing the sampling method includes changing the sampling rate.

26. A hand-held computer device for interactive data acquisition and analysis as set forth in claims 17 or 24, wherein said alteration of the process of data acquisition comprises changing the sampling method includes changing the sampling interval.

27. A hand-held computer device for interactive data acquisition and analysis as set forth in claims 17 or 24, wherein said alteration of the process of data acquisition comprises changing the sampling method includes changing the sampling scale.

28. A hand-held computer device for interactive data acquisition and analysis as set forth in claims 17, 24, 25, 26, or 27, wherein said means for analyzing data further enables display of a particular dynamic pattern resulting from said analysis of two sets of data records the first set being compared against a second set acquired after said alteration of the process of data acquisition.

29. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data against a second set acquired from an alternate sample location.

30. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data against a second set acquired from an alternate sensor calibration.

31. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data against a second set acquired from an alternate time period.

32. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data against a known baseline.

33. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data against a second set acquired from an alternate and previously sampled environment.

34. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data acquired through said external sensor against a second set acquired from an external computer.

35. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data acquired through said external sensor against a second set acquired from a network.

36. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data acquired through said external sensor against a second set contained within said attachable module.

37. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data acquired through said external sensor against a second set acquired from a second hand-held computer

device with a like attachable module and external sensor operating in the same environment and time as the first hand-held computer device.

38. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data acquired through said external sensor against a second set acquired from a second hand-held computer device with a like attachable module and external sensor operating in the same environment and different time as the first hand-held computer device.

39. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data acquired through said external sensor against a second set acquired from a second hand-held computer device with a different attachable module and external sensor operating in the same environment and time as the first hand-held computer device.

40. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data acquired through said external sensor against a second set acquired from a second hand-held computer device with a different attachable module and external sensor operating in the same environment and different time as the first hand-held computer device.

41. A hand-held computer device for interactive data acquisition and analysis as set forth in claim 17, wherein said means for analyzing data comprises comparing a first set of data acquired through said external sensor against a second set acquired from a second hand-held computer device with a different attachable module and external sensor operating in a different environment and different time as the first hand-held computer device.

42. A hand-held computer device for interactive data acquisition and user annotation.

comprising:

- a display screen;
- a central processing unit;
- memory for dynamic storage of programs and data: .memory for static storage of programs and data;
- means for connecting said hand-held computer device to an external computer;
- an operating system for said hand-held computer device;
- means for user input for user annotation on the data acquisition process;
- a set of controls for user interaction with said hand-held computer device;
- means for interactive data acquisition, further comprising:
- application software means for configuring said controls for user interaction to the allowable operations to be performed by said user during the data acquisition process;

and,

- application software means governing said interactive data acquisition, further comprising software to govern the initiation, ending, and collection of data by the use of said set of controls by the user of said hand-held computer device, wherein said software includes means for using said controls as configured to selectively;
- accept said digital signals from said attachable module;
- display said digital signals from the attachable module for configurable data acquisition on said display screen;
- record said digital signals from the attachable module for configurable data acquisition into said dynamic memory;

- record said digital signals from the attachable module for configurable data acquisition into said static memory for long-term, unpowered storage; and,
- perform all other allowable operations to be performed by said user during the data acquisition process: .means for analyzing data; and,
- a attachable module for configurable data acquisition, wherein said attachable module further comprises:
  - means for communication with said hand-held computer device;
  - means for connection to an external sensor; and,
  - an analog-to-digital converter to translate analog data readings from said external sensor to digital signals for transmission to said hand-held computer device.

43. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said means for user input for user annotation on the data acquisition process is a displayed alphabetic keyboard on said display screen.

44. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 or 43, wherein said displayed alphabetic keyboard on said display screen is language-configurable.

45. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said means for user input for user annotation on the data acquisition process is a shorthand supported by said operating system and application software.

46. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said means for user input for user annotation on the data acquisition process is a set of iconic representations of possible commands.

47. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said means for user input for user annotation on the data acquisition process is a set of graphical representation of possible commands.

48. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42 or 47, wherein said set of graphical representation of possible commands includes previously-defined library of symbols contained in said attachable module.

49. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42 or 47, wherein said set of graphical representation of possible commands includes previously-defined library of symbols contained in said hand-held computer device.

50. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42 or 47, wherein said set of graphical representation of possible commands includes previously-defined library of symbols contained in said external computer.

51. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said means for user input for user annotation on the data acquisition process is recognition of handwritten entries made upon said display screen.

52. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said means for user input for user annotation on the data acquisition process is direct entry as a graphical image of hand-drawings upon said display screen by said user.

53. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said means for user input for user annotation on the data acquisition process is interpreted entry of one or more characters drawn by said user upon said display screen.

54. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said means for user input for user annotation on the data acquisition process is interpreted entry of one or more ideograms drawn by said user upon said display screen.

55. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said means for user input is a scanner for textual material.

56. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said means for user input is a scanner for magnetic codes.

57. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said means for user input is a scanner for predefined codes.

58. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said application software means for configuring said controls for user interaction to the allowable operations to be performed by said user during the data acquisition process, further includes software that configures the display on said display screen.

59. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 and 58, wherein the display on said display screen may be altered to display the measuring units selected by the user.

60. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 and 58, wherein the display on said display screen may be altered to display the scale selected by the user.

61. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 and 58, wherein the display on said display screen may be altered to display the sampling interval selected by the user.

62. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 and 58, wherein the display on said display screen may be altered to display the sampling rate selected by the user.

64. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 and 58, wherein the display on said display screen may be altered to display a particular portion of the data acquired as selected by the user.

65. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said application software means governing said interactive data acquisition, further comprising software to govern the initiation, ending, and collection of data by the use of said set of controls by the user of said hand-held computer device, includes software that permits the user to select the external sensor for the data acquisition process.

66. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said application software means governing said interactive data acquisition, further comprising software to govern the initiation, ending, and collection of data by the use of said set of controls by the user of said hand-held computer device, includes software that permits the user to alter the location for a control displayed on the display screen.

67. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said application software means governing said interactive data



acquisition, further comprising software to govern the initiation, ending, and collection of data by the use of said set of controls by the user of said hand-held computer device, includes software that permits the user to alter the meaning of a hardware control on said hand-held computer device.

68. A hand-held computer device for interactive data acquisition and user annotation as set forth in claim 42, wherein said application software means governing said interactive data acquisition, further comprising software to govern the initiation, ending, and collection of data by the use of said set of controls by the user of said hand-held computer device, includes software that permits the user to alter the process used for data acquisition.

69. A hand-held computer device for interactive data acquisition and user annotation, comprising:

- a display screen;
- a central processing unit;
- memory for dynamic storage of programs and data: .memory for static storage of programs and data;
- means for connecting said hand-held computer device to an external computer;
- an operating system for said hand-held computer device;
- means for user input for user annotation external to the data acquisition process;
- a set of controls for user interaction with said hand-held computer device;
- means for interactive data acquisition, further comprising:

- application software means for configuring said controls for user interaction to the allowable operations to be performed by said user during the data acquisition process; and,
- application software means governing said interactive data acquisition, further comprising software to govern the initiation, ending, and collection of data by the use of said set of controls by the user of said hand-held computer device, wherein said software includes means for using said controls as configured to selectively:
  - accept said digital signals from said attachable module;
  - display said digital signals from the attachable module for configurable data acquisition on said display screen;
  - record said digital signals from the attachable module for configurable data acquisition into said dynamic memory;
  - record said digital signals from the attachable module for configurable data acquisition into said static memory for long-term, unpowered storage; and,
  - perform all other allowable operations to be performed by said user during the data acquisition process: .means for analyzing data;
  - means for user input for user annotation external to the data analysis; and,
  - a attachable module for configurable data acquisition, wherein said attachable module further comprises:
    - means for communication with said hand-held computer device,
    - means for connection to an external sensor; and,
    - an analog-to-digital converter to translate analog data readings from said external sensor to digital signals for transmission to said hand-held computer device.

70. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 or 68, wherein said means for user input for user annotation external to the data acquisition process enable user annotation that simultaneously with the data acquisition.

71. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 or 68, wherein said means for user input for user annotation external to the data acquisition process includes software that permits the user to annotate a particular part of the data acquisition process.

72. A hand-held computer device for interactive data acquisition and user annotation as set, forth in claims 42 or 68, wherein said means for user input for user annotation external to the data acquisition process includes software that permits the user to annotate a particular observational run.

73. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 or 68, wherein said means for user input for user annotation external to the data analysis includes software that permits the user to annotate a particular analysis.

74. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 or 68, wherein said means for user input for user annotation external to the data analysis includes software that enables the user to annotate a particular attachable module.

75. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 or 68, wherein said means for user input for user annotation external to the data analysis includes software that enables the user to annotate a particular external sensor.

76. A hand-held computer device for interactive data acquisition and user annotation as set forth in claims 42 or 68, wherein said means for user input for user annotation external to the data analysis includes software that enables the user to annotate said means for user input.

77. A hand-held computer device for interactive data acquisition, user annotation, and calibration of the data acquisition, comprising:

- a display screen;
- a central processing unit;
- memory for dynamic storage of programs and data;
- memory for static storage of programs and data;
- means for connecting said hand-held computer device to an external computer;
- an operating system for said hand-held computer device;
- means for user input for user annotation external to the data acquisition process;
- a set of controls for user interaction with said hand-held computer device;
- means for interactive data acquisition, further comprising:
- application software means for configuring said controls for user interaction; and,
- application software means governing said interactive data acquisition;
- means for analyzing data;
- means for user annotation;
- a attachable module for configurable data acquisition, wherein said attachable module further comprises:
- means for communication with said hand-held computer device: .means for connection to an external sensor; and,

- an analog-to-digital converter to translate analog data readings from said external sensor to digital signals for transmission to said hand-held computer device; and,
- means for calibrating the digital signals for transmission to said hand-held computer device to reflect actual performance of said external sensor.

78. A hand-held computer device for interactive data acquisition, user annotation, and calibration of the data acquisition as set forth in claim 77, specifically configured for sensing and analyzing for earth science.

79. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 78 specifically configured for sensing and analyzing soil chemistry.

80. A hand-held computer device, attachable module, application software means, and 1 external sensor as set forth in claim 79 specifically configured for sensing and analyzing soil pH.

79. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 79 specifically configured for sensing and analyzing soil humidity.

80. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 79 specifically configured for sensing and analyzing soil nitrogen levels.

81. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing botanical conditions.

82. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 81 specifically configured for sensing and analyzing plant color.

83. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing a plant's moisture level.

84. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing a weather condition.

85. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 85 specifically configured for sensing and analyzing barometric pressure.

86. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 85 specifically configured for sensing and analyzing wind speed.

87. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 85 specifically configured for sensing and analyzing atmospheric humidity.

88. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing a particular chemical.

89. A hand-held computer device, attachable module, application software means, and

external sensor as set forth in claim 77 specifically configured for sensing and analyzing a particular chemical compound.

90. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing a particular organic compound.

91. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing a particular protein.

92. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing a particular genetic fragment.

93. A hand-held computer device, attachable, module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing a biological reading.

94. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 93 specifically configured for sensing and analyzing a heartbeat.

95. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 93 specifically configured for sensing and analyzing a nervous system's electrical activity.

96. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 93 specifically configured for sensing and analyzing a human biological condition.

97. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 88, 89, 90, 91, 92, 94, 95, or 96 specifically configured for sensing and analyzing a particular human biological output.

98. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 93 specifically configured for sensing and analyzing an exercise-related biological output.

99. A hand-held computer device, attachable module, application software means, and- external sensor as set forth in claims 93 or 96 specifically configured for sensing and analyzing a human, exercise-related biological output.

100. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 93 specifically configured for sensing and analyzing a potential dietary input.

101. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 96 specifically configured for sensing and analyzing a potential human dietary input.

102. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 93 specifically configured for sensing and analyzing a blood chemistry condition.



103. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 93 or 96 specifically configured for sensing and analyzing a human blood chemistry condition.

104. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 103 specifically configured for sensing and analyzing a human blood sugar level.

105. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 103 specifically configured for sensing and analyzing a human blood white cell count.

106. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 103 specifically configured for sensing and analyzing a human blood oxygen level.

107. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 96 specifically configured for sensing and analyzing the dilation of a pupil.

108. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 96 specifically configured for sensing and analyzing a human's skin color.

109. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 93 or 96 specifically configured for sensing and analyzing renal output.

110. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 96 specifically configured for sensing and analyzing a human electrocardiogram reading.

111. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 96 specifically configured for sensing and analyzing a human electroencephalogram reading.

112. A hand-held computer device, attachable module, application software means, and at least two external sensors as set forth in claim 77 specifically configured for sensing and analyzing a combination of readings.

113. A hand-held computer device, attachable module, application software means, and at least two external sensors as set forth in claim 93 specifically configured for sensing and analyzing a combination of readings.

114. A hand-held computer device, attachable module, application software means, and at least two external sensors as set forth in claim 96 specifically configured for sensing and analyzing a combination of readings.

115. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing motion.

116. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing a security condition.

117. A hand-held computer device, attachable, module, application software means, and external sensor as set forth in claim 116 specifically configured for sensing and analyzing an input for access permission.

118. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing an input for identity verification.

119. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 118 specifically configured for sensing and analyzing an input for authorization of a particular action.

120. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 77 specifically configured for sensing and analyzing a physical stock inventory.

121. A hand-held computer device, attachable module, application software means, and external sensor as set forth in claim 116 specifically configured for sensing and analyzing perimeter security.

122. Two or more hand-held computer devices for interactive data acquisition, user annotation, and calibration of the data acquisition, used together to acquire and analyze data from at least one external sensor, each said hand-held computer device comprising:

- a display screen;
- a central processing unit;
- memory for dynamic storage of programs and data;
- memory for static storage of programs and data;
- means for connecting said hand-held computer device to an external computer;
- an operating system for said hand-held computer device;
- means for user input for user annotation external to the data acquisition process;
- a set of controls for user interaction with said hand-held computer device;
- means for interactive data acquisition, further comprising:
- application software means for configuring said controls for user interaction; and,
- application software means governing said interactive data acquisition;
- means for analyzing data;
- means for user annotation;
- a attachable module for configurable data acquisition;
- wherein said attachable module further comprises:
- means for communication with said hand-held computer device;
- means for connection to an external sensor; and,
- an analog-to-digital converter to translate analog data readings from said external sensor to digital signals for transmission to said hand-held computer device, and,
- means for calibrating the digital signals for transmission to said hand-held computer device to reflect actual performance of said external sensor.

123. Two or more hand-held computer devices for interactive data acquisition, user annotation, and calibration of the data acquisition, used together to acquire and analyze data from at least one external sensor as set forth in claim 122, wherein each uses the same sensor, attachable module, and application software.

123. Two or more hand-held computer devices for interactive data acquisition, user annotation, and calibration of the data acquisition, used together to acquire and analyze data from at least one external sensor as set forth in claim 122, wherein at least one uses a different sensor, attachable module, and application software.

124. Two or more hand-held computer devices for interactive data acquisition, user annotation, and calibration of the data acquisition, used together to acquire and analyze data from at least one external sensor as set forth in claim 122, connected to an external computer.

125. Two or more hand-held computer devices for interactive data acquisition, user annotation, and calibration of the data acquisition, used together to acquire and analyze data from at least one external sensor as set forth in claim 122, connected to a network of more than one external computers.

126. A method of using an interactive, hand-held computer device to acquire and analyze data from at least one external sensor, said hand-held computer device comprising:

- a display screen;
- a central processing unit;
- memory for dynamic storage of programs and data: .memory for static storage of programs and data;

- means for connecting said hand-held computer device to an external computer;
- an operating system for said hand-held computer device;
- means for user input for user annotation external to the data acquisition process;
- a set of controls for user interaction with said hand-held computer device;
- means for interactive data acquisition, further comprising:
- application software means for configuring said controls for user interaction; and,
- application software means governing said interactive data acquisition;
- means for analyzing data;
- means for user annotation; and,
- an attachable module for configurable data acquisition, wherein said attachable module further comprises:
- means for communication with said hand-held computer device;
- means for connection to an external sensor; and,
- an analog-to-digital converter to translate analog data readings from said external sensor to digital signals for transmission to said hand-held computer device;
- wherein said method comprises the following steps, repeated as described;
- obtaining the desired application software, attachable module, and external sensor;
- starting said device;
- selecting a desired sensor through which data is to be acquired;
- beginning new data acquisition, further comprising the steps of:
- adding a new trial;
- setting data acquisition parameters;
- previewing data acquisition;

- acquiring data;
- viewing unsaved data; and,
- saving acquired data;
- coincidentally annotating the data acquisition process;
- analyzing said acquired data;
- coincidentally annotating the data analysis; and,
- ending that particular acquisition and analysis.

126. A method of using an interactive, hand-held computer device to calibrate a desired external sensor, acquire data from said external sensor, analyze said acquired data, and annotate said calibration, acquisition, and analysis, wherein said hand-held computer device comprises:

- a display screen;
- a central processing unit;
- memory for dynamic storage of programs and data: .memory for static storage of programs and data;
- means for connecting said hand-held computer device to an external computer;
- an operating system for said hand-held computer device;
- means for user input for user annotation external to the data acquisition process;
- set of controls for user interaction with said hand-held computer device;
- means for interactive data acquisition, further comprising:
- application software means for configuring said controls for user interaction; and,

- application software means governing said interactive data acquisition;
- means for analyzing data;
- means for user annotation;
- a attachable module for configurable data acquisition, wherein said attachable module further comprises:
  - means for communication with said hand-held computer device;
  - means for connection to an external sensor, and,
  - an analog-to-digital converter to translate analog data readings from said external sensor to digital signals for transmission to said hand-held computer device; and,
  - means for calibrating the digital signals for transmission to said hand-held computer device to reflect actual performance of said external sensor;
- wherein said method comprises the following steps, repeated as desired;
- obtaining the desired application software, attachable module, and external sensor;
- starting said device;
- selecting a desired sensor through which data is to be acquired;
- beginning new data acquisition, further comprising the steps of:
  - adding a new trial;
  - setting data acquisition parameters;
  - previewing data acquisition;
  - calibrating said external sensor if desired;



- acquiring data;
- viewing unsaved data; and,
- saving acquired data;
- coincidentally annotating the data acquisition process;
- analyzing said acquired data;
- coincidentally annotating the data analysis; and,
- ending that particular acquisition and analysis.

127. A hand-held computer device for interactive data acquisition, user annotation, calibration of the data acquisition, and interaction with a peripheral device comprising:

- a display screen;
- a central processing unit;
- memory for dynamic storage of programs and data; .memory for static storage of programs and data;
- means for connecting said hand-held computer device to an external computer;
- an operating system for said hand-held computer device;
- means for user input for user annotation external to the data acquisition process;
- a set of controls for user interaction with said hand-held computer device;
- means for interactive data acquisition; further comprising;
- application software means for configuring said controls for user interaction; and,
- application software means governing said interactive data acquisition;
- means for analyzing data;

- means for user annotation;
- means for communicating between said hand-held computer device and said peripheral device;
- a attachable module for configurable data acquisition, wherein said attachable module further comprises:
  - means for communication with said hand-held computer device;
  - means for connection to an external sensor; and,
  - an analog-to-digital converter to translate analog data readings from said external sensor to digital signals for transmission to said hand-held computer device; and,
  - means for calibrating the digital signals for transmission to said hand-held computer device to reflect actual performance of said external sensor.

128. A method of using an interactive, hand-held computer device to calibrate a desired external sensor, acquire data from said external sensor, analyze said acquired data, interact with a peripheral device, and annotate said calibration, acquisition, analysis and interaction, wherein said hand-held computer device comprises:

- a display screen;
- a central processing unit;
- memory for dynamic storage of programs and data;
- memory for static storage of programs and data;
- means for connecting said hand-held computer device to an external computer;
- an operating system for said hand-held computer device;
- means for user input for user annotation external to the data acquisition process;
- a set of controls for user interaction with said hand-held computer device;

- means for interactive data acquisition, further comprising:
- application software means for configuring said controls for user interaction; and,
- application software means governing said interactive data acquisition;
- means for analyzing data;
- means for user annotation;
- means for communicating between said hand-held computer device and said peripheral device;
- a attachable module for configurable data acquisition, wherein said attachable module further comprises:
  - means for communication with said hand-held computer device;
  - means for connection to an external sensor; and,
  - an analog-to-digital converter to translate analog data readings from said external sensor to digital signals for transmission to said hand-held computer device: and,
  - means for calibrating the digital signals for transmission to said hand-held computer device to reflect actual performance of said external sensor;
- wherein said method comprises the following steps, repeated as desired;
- obtaining the desired application software, attachable module, and external sensor;
- starting said device;
- selecting a desired sensor through which data is to be acquired;
- beginning new data acquisition, further comprising the steps of:
  - adding a new trial;
  - setting data acquisition parameters;
  - previewing data acquisition;

- calibrating said external sensor if desired;
- acquiring data;
- viewing unsaved data; and,
- saving acquired data;
- coincidentally annotating the data acquisition process;
- analyzing said acquired data;
- coincidentally annotating the data analysis;
- interacting with said peripheral device; and,
- ending that particular acquisition, analysis, annotation, and interaction.